**Vocabulary: Torque and Moment of Inertia**

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**Vocabulary**

* Angular acceleration – the rate of change in the angular velocity of a rotating object.
  + The symbol for angular acceleration is *α* (alpha).
  + The angular velocity (*ω*) of an object is equal to the angle through which it rotates in a given time. Units of angular velocity may be degrees per second (°/s) or radians per second (rad/s).
  + To find the angular acceleration, divide the change in angular velocity (*Δω*) by the elapsed time (*Δt*): *α* = *Δω/Δt*.
* Fulcrum – the pivot point of a *lever*.
* Lever – a simple machine made of a stiff plank or bar that pivots on a fulcrum.
  + A see-saw is an example of a *first-class lever*, which is a lever with the fulcrum between the effort and the load.
* Moment of inertia – resistance to change in angular velocity.
  + The symbol for moment of inertia is *I*.
  + An object’s moment of inertia depends on its mass and how the mass is distributed around the center of rotation.
  + For a point with mass *m* and distance *r* from the center of rotation, the moment of inertia is given by the formula: *I* = *mr2*.
* Newton’s second law – the force acting on an object is equal to the product of its mass and acceleration: *F* = *ma*.
  + The greater the force on an object, the greater its acceleration.
  + If you add mass to an object, it will accelerate less rapidly under a given force.
  + For a rotating body, Newton’s second law states that *torque* (*τ*) is equal to the product of moment of inertia (*I*) and angular acceleration (*α*): *τ* = *Iα*.
* Torque – a twisting force that causes rotation.
  + The symbol for torque is *τ* (tau).
* Weight – the downward force of gravity on an object.
  + To calculate weight (*w*), multiply mass (*m*) by gravitational acceleration (*g*):

*w* = *mg*

* + - On Earth’s surface, *g* is equal to 9.81 m/s2.